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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,390	07/01/2005	Joseph Gan	62897B	1202
109 7590 03/17/2008 The Dow Chemical Company Intellectual Property Section P.O. Box 1967 Midland, MI 48641-1967				
EXAMINER FEELY, MICHAEL J				
ART UNIT		PAPER NUMBER		
1796				
MAIL DATE		DELIVERY MODE		
03/17/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/541,390

**Applicant(s)**

GAN ET AL.

**Examiner**

Michael J. Feely

**Art Unit**

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SF/ICE)  
Paper No(s)/Mail Date 20060213
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Pending Claims***

Claims 1-20 are pending.

### ***Specification***

1. The disclosure is objected to because of the following informalities: figures 1 & 2 (*see pages 8-9*) have been embedded in the specification. Figures (drawings) should be submitted separately from the specification. The chemical structures may remain in the specification; however, the figure headings should be removed. Appropriate correction is required.

### ***Claim Objections***

2. Claim 5 is objected to because of the following informalities: figures 1 & 2 have been embedded in the claim. Figures (drawing) should be submitted separately from the specification. The chemical structures may remain in the claim; however, the figure headings should be removed. Appropriate correction is required.

### ***Priority***

3. The effective filing date of the instant application is 02/06/2003, going back to the filing of US Provisional application No. 60/445,638. The instant invention is fully supported by the provisional application.

*Claim Rejections - 35 USC § 102/103*

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-4, 6-10, and 19 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Higaki (JP 2000-309699).

Regarding claims 1-4, 6-10, and 19, Higaki discloses: (1) a halogen-free ignition resistant polymer composition (Abstract) comprising: (A) a thermoplastic polymer or polymer blend (Abstract), and (B) a multi-functional epoxy resin containing from 0-20 wt. percent residual epoxy groups, based on the total weight of the epoxy resin (Abstract; paragraphs 0056-0057; *see also product data sheets for BPA Epoxy YD Series and Phenoxy Resins PHENO TOHTO*), and (C) a phosphorus containing compound (Abstract);

(2) wherein (A) is selected from the group consisting of: *see claim for list* (Abstract); (3) wherein (A) is selected from the group consisting of: styrene-butadiene block copolymers, polystyrene, high impact polystyrene, acrylonitrile-butadiene-styrene copolymers, and styrene-acrylonitrile copolymers (Abstract);

(4) wherein (A) is from 40 to 94 weight percent (Abstract; paragraph 0011); (B) is from 1 to 30 weight percent (Abstract; paragraph 0011); and (C) is from 5 to 30 weight percent (Abstract; paragraph 0011) of the total weight of the halogen-free ignition resistant polymer composition;

(6) wherein the multi-functional epoxy resin is a material produced from an epoxy resin which possesses, on average, more than 1 epoxy group per molecule (Abstract; paragraphs 0056-0057; *see also product data sheets for BPA Epoxy YD Series and Phenoxy Resins PHENO TOHTO*);

(8) wherein the modified multi-functional epoxy resin contains less than 15 weight percent residual epoxy groups, based on the total weight of the epoxy resin (Abstract; paragraphs 0056-0057; *see also product data sheets for BPA Epoxy YD Series and Phenoxy Resins PHENO TOHTO*); (9) wherein the modified multi-functional epoxy resin contains less than 12 weight percent residual epoxy groups, based on the total weight of the epoxy resin (Abstract; paragraphs 0056-0057; *see also product data sheets for BPA Epoxy YD Series and Phenoxy Resins PHENO TOHTO*); (10) wherein the modified multi-functional epoxy resin contains less than 10 weight percent residual epoxy groups, based on the total weight of the epoxy resin (Abstract; paragraphs 0056-0057; *see also product data sheets for BPA Epoxy YD Series and Phenoxy Resins PHENO TOHTO*);

(19) an article produced from the halogen-free ignition resistant polymer composition of claim 1 (Abstract; paragraph 0082).

Higaki fails to explicitly disclose: *(1) a modified multi-functional epoxy having a residual epoxy content of 0-20 wt%; and (7) wherein the modified multi-functional epoxy resin is functionally modified with more than one modifier.*

Looking to the specification, this *modification* involves the reduction of epoxy groups in the resin component (B). This material has an initial amount of residual epoxy groups and a post-modification amount of residual epoxy groups (0-20 wt%). However, it should be noted that this is a product-by-process limitation. It has been founds that, “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process,” – *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (*see MPEP 2113*). In the instant case, there appears to be an obvious (*or no*) difference between the *modified* material of the instant claims and the materials set forth in Higaki, so long as they both satisfy the instantly claimed *residual epoxy content*.

Therefore, it appears that component (F) of Higaki inherently or obviously satisfies the instantly claimed component (B) because both feature an epoxy resin containing 0-20 wt percent of residual epoxy groups.

7. Claims 1-20 are rejected under 35 U.S.C. 102(a) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yang et al. (WO 02/100947 A1). It should be noted that US Pat. No. 7,148,275 is an equivalent document.

Regarding claims 1-20, Yang et al. disclose: *(I)* a halogen-free ignition resistant polymer composition (Abstract; Summary of the Invention) comprising: (A) a thermoplastic polymer or polymer blend (Abstract; pages 3-4), and (B) a multi-functional epoxy resin containing from 0-20 wt. percent residual epoxy groups, based on the total weight of the epoxy resin (Abstract; pages 4-5), and (C) a phosphorus containing compound (Abstract; pages 5-6);

*(II)* consisting essentially of: (A) from 40 to 94 weight percent, based on the total weight of the composition, of a thermoplastic polymer (Abstract; pages 3-4), optionally comprising 10-35 weight percent, based on the total weight of the composition, of a polyphenylene ether polymer (*optional*); (B) from 1 to 30 weight percent, based on the total weight of the composition, of a multi-functional epoxy resin containing from 0-20 wt. percent, based on the total weight of the epoxy resin, residual epoxy groups (Abstract; pages 4-5); and (C) from 5 to 30 weight percent, based on the total weight of the composition, of a phosphorus compound such as an aryl phosphate (Abstract; pages 5-6);

*(2 & 12)* wherein (A) is selected from the group consisting of: *see claim for list* (Abstract; pages 3-4); *(3 & 13)* wherein (A) is selected from the group consisting of: styrene-butadiene block copolymers, polystyrene, high impact polystyrene, acrylonitrile-butadiene-styrene copolymers, and styrene-acrylonitrile copolymers (Abstract; pages 3-4);

*(4)* wherein (A) is from 40 to 94 weight percent (Abstract; pages 3-4); (B) is from 1 to 30 weight percent (Abstract; pages 4-5); and (C) is from 5 to 30 weight percent (Abstract; pages 5-6) of the total weight of the halogen-free ignition resistant polymer composition;

*(5)* wherein (B) is a multi-functional epoxy resin derived from a multi- functional epoxy resin selected from the following structures *see claims for structures* (pages 4-5);

(8 & 16) wherein the multi-functional epoxy resin contains less than 15 weight percent residual epoxy groups, based on the total weight of the epoxy resin (pages 4-5); (9 & 17) wherein the modified multi-functional epoxy resin contains less than 12 weight percent residual epoxy groups, based on the total weight of the epoxy resin (pages 4-5); (10 & 18) wherein the modified multi-functional epoxy resin contains less than 10 weight percent residual epoxy groups, based on the total weight of the epoxy resin (pages 4-5);

(19) an article produced from the halogen-free ignition resistant polymer composition of claim 1 (Examples; claims); and

(20) an article produced from the halogen-free ignition resistant polymer composition of Claim 18 (Examples; claims).

Yang et al. fail to explicitly disclose: (1) a *modified* multi-functional epoxy having a residual epoxy content of 0-20 wt%; (6 & 14) wherein the *modified* multi-functional epoxy resin is a material produced from an epoxy resin which possesses, on average, more than 1 epoxy group per molecule; and (7 & 15) wherein the *modified* multi-functional epoxy resin is *functionally modified* with more than one *modifier*.

Looking to the specification, this *modification* involves the reduction of epoxy groups in the resin component (B). This material has an initial amount of residual epoxy groups and a post-modification amount of residual epoxy groups (0-20 wt%). However, it should be noted that this is a product-by-process limitation. It has been founds that, "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a



product of the prior art, the claim is unpatentable even though the prior product was made by a different process,” – *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (*see MPEP 2113*). In the instant case, there appears to be an obvious (*or no*) difference between the *modified* material of the instant claims and the materials set forth in Yang et al., so long as they both satisfy the instantly claimed *residual epoxy content*.

Therefore, it appears that component (B) of Yang et al. inherently or obviously satisfies the instantly claimed component (B) because both feature an epoxy resin containing 0-20 wt percent of residual epoxy groups.

#### ***Claim Rejections - 35 USC § 103***

8. Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al. (WO 02/12393 A1) in view of Asano et al. (US Pat. No. 5,641,839). US Pat. No. 7,244,786 is an *English-equivalent* of the WIPO document. All citations are directed to US Pat. No. 7,244,786.

Regarding claims 1-20, Matsumoto et al. disclose: (I) a halogen-free ignition resistant polymer composition (Abstract; column 2, line 31 through column 3, line 40) comprising: (A) a thermoplastic polymer or polymer blend (Abstract; column 2, line 31 through column 3, line 40), and (B) an epoxy resin (Abstract; column 2, line 31 through column 3, line 40), and (C) a phosphorus containing compound (Abstract; column 2, line 31 through column 3, line 40);

(II) consisting essentially of: (A) from 40 to 94 weight percent, based on the total weight of the composition, of a thermoplastic polymer (Abstract; column 2, line 31 through column 3, line 40), optionally comprising 10-35 weight percent, based on the total weight of the

composition, of a polyphenylene ether polymer (*optional*); (B) from 1 to 30 weight percent, based on the total weight of the composition, of an epoxy resin (Abstract; column 2, line 31 through column 3, line 40); and (C) from 5 to 30 weight percent, based on the total weight of the composition, of a phosphorus compound such as an aryl phosphate (Abstract; column 2, line 31 through column 3, line 40);

(2 & 12) wherein (A) is selected from the group consisting of: *see claim for list* (column 3, lines 53-57); (3 & 13) wherein (A) is selected from the group consisting of: styrene-butadiene block copolymers, polystyrene, high impact polystyrene, acrylonitrile-butadiene-styrene copolymers, and styrene-acrylonitrile copolymers (column 3, lines 53-57);

(4) wherein (A) is from 40 to 94 weight percent (Abstract; column 2, line 31 through column 3, line 40); (B) is from 1 to 30 weight percent (Abstract; column 2, line 31 through column 3, line 40); and (C) is from 5 to 30 weight percent (Abstract; column 2, line 31 through column 3, line 40) of the total weight of the halogen-free ignition resistant polymer composition; and

(19 & 20) an article produced from the halogen-free ignition resistant polymer composition (Abstract; column 2, line 31 through column 3, line 40).

Matsumoto et al. disclose the use of a novolac-type epoxy resin in their composition. Their composition is highly resistant to flames and features sufficient mechanical properties (*impact and heat resistance*). However, they fail to disclose the following: (1 & 11) a modified multi-functional epoxy resin containing from 0-20 wt. percent residual epoxy groups, based on the total weight of the epoxy resin; (5) wherein (B) is a modified multi-functional epoxy resin derived from a multi- functional epoxy resin selected from the following structures *see claims for*

*structures; (6 & 14)* wherein the modified multi-functional epoxy resin is a material produced from an epoxy resin which possesses, on average, more than 1 epoxy group per molecule; *(7 & 15)* wherein the modified multi-functional epoxy resin is functionally modified with more than one modifier; *(8 & 16)* wherein the modified multi-functional epoxy resin contains less than 15 weight percent residual epoxy groups, based on the total weight of the epoxy resin; *(9 & 17)* wherein the modified multi-functional epoxy resin contains less than 12 weight percent residual epoxy groups, based on the total weight of the epoxy resin; and *(10 & 18)* wherein the modified multi-functional epoxy resin contains less than 10 weight percent residual epoxy groups, based on the total weight of the epoxy resin.

Asano et al. disclose a modified novolac-type epoxy resin (*see Abstract*). Specifically, they reduce the number of epoxy groups, wherein: "It has been found that by slightly reducing the functional (*epoxy*) group content, the cross-linking density and modulus (E) can be decreased while maintaining heat resistance and mechanical characteristics, thereby achieving a low stress," (*see column 2, lines 31-35*). This type of modification would appear to be desirable in Matsumoto et al., in order to achieve a desired level of impact and heat resistance, along with a low stress. Such a modification would have obviously satisfied the component (B) limitations set forth in claims *(1, 5-11 & 14-18)*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the instantly claimed component (B), as taught by Asano et al., as a substitute for the novolac-type epoxy resin of Matsumoto et al. because Asano et al. disclose a modified novolac-type epoxy resin, wherein a reduction of epoxy groups yields a low stress product while maintaining heat resistance and mechanical characteristics. This type of modification would

appear to be desirable in Matsumoto et al., in order to achieve a desired level of impact and heat resistance, along with a low stress.

### *Communication*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/  
Primary Examiner, Art Unit 1796

March 2, 2008